

W. Nicholaichuk

Hydrology Division
National Hydrology Research Institute
Environment Canada
Saskatoon, Saskatchewan
S7N 3H5

**DROUGHT MONITORING, DETECTION
& EARLY WARNING - SUMMARY**

NHRI Symposium No.2, 125-126, 1988

NHRI Contribution No.88028

1988



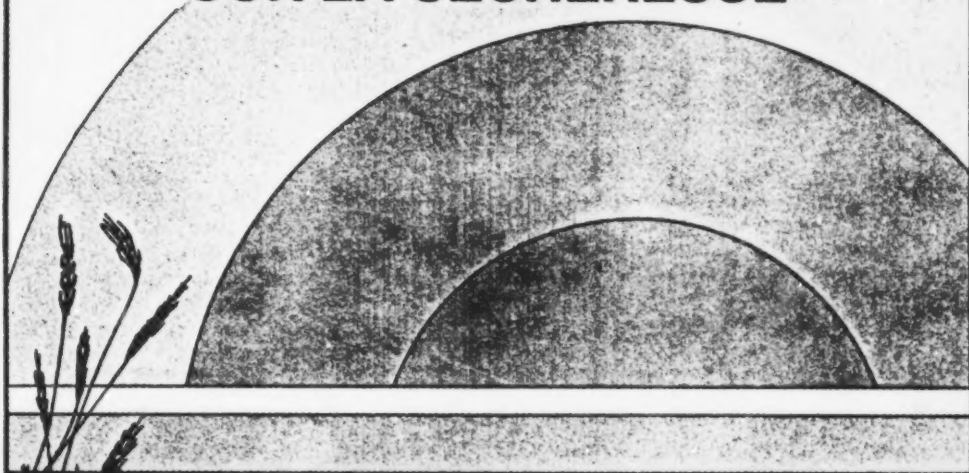
Environment
Canada

Environnement
Canada

90-06495/

PROCEEDINGS OF THE PRAIRIE DROUGHT WORKSHOP

COMPTES RENDU DE L'ATELIER SUR LA SECHERESSE



Saskatoon, Saskatchewan
October 11-13, 1988 / le 11-13 octobre, 1988

Sponsored by

ENVIRONMENT CANADA

National Hydrology Research Institute
Canadian Climate Centre

AGRICULTURE CANADA

Prairie Farm Rehabilitation
Administration

Parrainé par

ENVIRONNEMENT CANADA

Institut national de recherche en hydrologie
Centre Climatologique Canadien

AGRICULTURE CANADA

Administration du retablissement
agricole des prairies

DROUGHT MONITORING, DETECTION & EARLY WARNING

Summary

W. Nicholaichuk - Session Chairman

Mr. Jim Laver of the Climate Analysis Center of the U.S. National Weather Service, a keynote speaker for the session, provided an excellent basis for the workshop discussions on drought definitions and indices, network design and sufficiency, remote sensing, geographical progression of drought and multi-year droughts. This summary reviews the highlights and itemizes the recommendations arising from the working group discussions.

Drought was found difficult to define except in the precise context of particular impacts. A 'holistic' index is ideal but is impractical. Although the P.D.I. and C.M.I. indices are recognized as not being perfect, they are worth maintaining. The main problem with indices are that they are useful on the supply side but do not exist for the demand side for water requirements. It is essential that the time scale be adopted to fit the particular drought in question.

Furthermore, indices are being used for purposes other than what they were designed for. As a result, it is necessary to educate both the users of indices and the public who respond to information based on these indices.

Standardize network designs should be standardized to improve network quality. Since many networks are designed for specific objectives in mind, it may be necessary to supplement a 'standardized network' with radar and satellite imagery. Since data originates from a number of different sources, a data management plan is required. Cross-boundary differences (ie. U.S.A. and Canada) should be resolved in order to expand the usefulness of existing data networks.

The development of Geographical Information Systems coupled with satellite data and existing data networks should be encouraged. This system would be linked with existing groundwater monitoring networks to provide a comprehensive data base for monitoring droughts.

The existing networks for monitoring drought were considered adequate except for soil moisture. Hydrometeorological networks do provide a means of detecting early warning signals of an impending drought based on fall soil moisture and snow pack accumulation and distribution. However, regional groundwater monitoring networks are considered inadequate for monitoring drought.

Remote sensing for drought detection, and monitoring has not been fully exploited. The main thrust of research should be in the area of remote sensing applications. There is a need to interpret the signals with respect to snow depth and water equivalent and soil moisture. This data should be supplemented with ground truth measurements. Since hydrometrological information appears to be the best indicator of pending droughts, the application of remote sensing technology combined with Geographical Information Systems should be a priority in drought research.

With respect to the geographical progression of drought, a general consensus emerged that there is a need for improved cross-border (U.S./Canada) communication for real time data. Suggestion was made that arrangements be made that data be standardized for this purpose and be centralized within agencies in both U.S. and Canada.

Analysis of multi-year droughts indicated the drought of the 1980's was more severe than that experienced in the 1930's. For example, in agriculture, the crops production and quality were more severely affected, cattle populations were decreased severely, and costs rose significantly. From a meteorological standpoint, precipitation deficits were similar but temperatures were higher. Hydrologically, the natural flows were lower than the 1930's. For example, Old Wive's Lake is drier now than on the 1930's. From a wildlife perspective, duck populations are at a all time low which has a dramatic effect on the industry (40,000 jobs and a billion dollars).

Recommendations that followed from the group discussions are summarized as follows:

1. Although the P.D.I. and C.M.I. are not perfect, they should be maintained. Time scales should be adopted that fit the drought in question.
2. It is necessary to educate both users of indices and the public who respond to information.
3. A data management plan should be developed that accommodates various data sources. In addition, there is a need to standardize network designs to improve data quality and a need to improve soil moisture monitoring.
4. Research in the area of remote sensing applications to monitor snow depth, water equivalent and soil moisture should be encouraged.

Col. En 36-51272
HUPP SYMPOSIUM 16-2

ESL10079 1991
ESL10 662 56700 9